

CLAIMS

1. An expander comprising a cylinder, a shaft having an eccentric portion, a roller which is fitted to said eccentric portion and which eccentrically rotates inside said cylinder, a closing member for closing both end surfaces of said cylinder, a vane for partitioning a space formed by said cylinder, said roller and said closing member into a plurality of working chambers, a suction hole through which working fluid flows into said working chamber, a discharge hole through which the working fluid is discharged from said working chamber into a discharge space, and flow-in timing control means which controls the flow of the working fluid into said suction hole, in which the expander expands the working fluid, wherein the expander which expands the working fluid further comprises pressure ratio control means which varies a ratio between pressure when expansion stroke of said working chamber is started and pressure when the expansion stroke is completed.
2. The expander according to claim 1, wherein a differential pressure regulating valve which is operated by a difference between pressure in said working chamber and pressure in said discharge space is used as said pressure ratio control means.
3. The expander according to claim 2, wherein said differential pressure regulating valve is provided in said discharge hole.
4. The expander according to claim 3, wherein said differential pressure regulating valve is closed when the pressure in said working chamber is lower than the pressure in said discharge space.
5. The expander according to claim 4, wherein said differential pressure regulating valve is a reed valve.

6. The expander according to claim 4, wherein said differential pressure regulating valve has a circular conical valve portion.

7. The expander according to claim 2, wherein said pressure ratio control means comprises a communication hole which brings said working chamber and said discharge space into communication with each other, and a differential pressure regulating valve provided in said communication hole.

8. The expander according to claim 7, wherein said differential pressure regulating valve is opened when the pressure in said working chamber is lower than the pressure in said discharge space.

9. The expander according to claim 8, wherein an opening of said communication hole to said working chamber is formed in said closing member.

10. The expander according to claim 2, wherein said pressure ratio control means comprises a first differential pressure regulating valve provided in said discharge hole, and a second differential pressure regulating valve provided in said communication hole which brings said working chamber and said discharge space into communication with each other.

11. The expander according to any one of claims 1 to 10, wherein fluid which expands from liquid phase or supercritical phase to gas-liquid two-phase is used as the working fluid.

12. The expander according to any one of claims 1 to 11, wherein the expander is utilized in a heat pump cycle which uses carbon dioxide as the working fluid.

13. The expander according to claim 12, wherein a shaft of said expander is directly connected to a shaft of a compressor

used in said heat pump cycle.